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OCTAHEDRAL LIMONITE.

BY ERASMUS HAWORTH.

I wish to call attention to a very interesting change now in process in the composition of certain iron pyrites crystals in Dickinson county, Kansas.

In the fall of 1880 I received a number of very perfect octahedral crystals from this county. They were small, their axes varying from one to three-eighths of an inch in length; were of a brown color; and a number of them were hard enough to scratch glass. Remembering that Professor Mudge had reported Spinel from Riley county, I at once concluded these were crystals of the black variety of Spinel, *Pleonaste*, which contains from eight to twenty per cent. of iron oxide. During the winter of 1882, Professor Patrick wrote me that he had examined some of them, and found nothing but iron oxide and traces of water, and suggested the probability of their being altered pyrite. I had no occasion to examine them further until within the last few weeks. On careful examination, it was found that the interior of many of them was unchanged iron pyrites, while the exterior was a hydrated iron oxide.

Through the kindness of Mr. Winnie Sterling, of Midway, Dickinson county, Kansas, I was furnished a much larger assortment of specimens. In this lot I found many crystals which were entirely free from indications of decomposition. Between this and the other extreme, in which there is no trace of sulphur, there is a regular gradation; so there can be no doubt as to the origin of the iron-oxide crystals.

Now the one interesting fact is, that we have here a complete change from the bisulphide of iron—pyrite—to the hydrated oxide of iron—limonite—without altering either the size or form of the crystal. The decomposition of pyrite is an every-day occurrence, familiar to all; but the usual process is to oxidize one-half of the sulphur to the common sulphurous acid gas, while the remaining sulphur, with the iron, is oxidized to ferrous sulphate—*copperas*—which is dissolved by percolating waters. Here, however, we have the whole of the sulphur, removed atom by atom, and its place snugly filled by oxygen and traces of water.

This is the only instance of which I have any knowledge of limonite occurring in octahedral crystals; in fact, it is quite unusual to find it even approaching a crystalline form. It frequently occurs with a smooth botryoidal surface and an internal fibrous structure; but in the case before us, so far as observed, there is no approach to a fibrous structure.

Mr. Sterling writes that he found the specimens near Midway, Dickinson county; that the brown ones—that is the ones partly or wholly decomposed—were found on the surface; that those which were undecomposed were found about two feet below the surface, in a black shale.

PENN COLLEGE, IOWA, November, 1883.

NOTE ON A NEW KANSAS MINERAL.

BY J. T. WILLARD.

Last summer, Mr. J. B. Stevenson, of Garrison, Riley county, sent a mineral to the laboratory of the Agricultural College for identification. It was at first supposed to be hematite, but the black streak obtained on powdering it showed that this surmise was incorrect. A more careful examination proved it to be menaccanite, or titanite iron ore. It occurs in irregular grains of an iron-black color, and submetallic luster. Its fracture is conchoidal, and on the broken surfaces it exhibits a peculiar luster, resembling that of